BeBook Neo E-Reader User Interface Issues

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Description

With the latest trends towards cutting back on paper use and move more and more of our lives to the digital realm, one product category that is slowly but steadily gaining popularity is the ebook reader. Initially made possible by the latest advances in e-ink display technology and popularized by Amazon's introduction of the Kindle, these products allow people to carry with them all the books they can ever read. The fundamental differentiator between the ebook readers and other portable devices is the display technologies used. These displays (whether e-ink or other emergent technologies) are designed to mimic the look of real paper and reduce eyestrain. Their biggest limitations include the slow refresh rate of the screen, remaining shadows after changing the displayed content, and the lack of colour.

The Dutch company Endless Ideas makes the BeBook Neo e-reader. The differentiating features of the Neo are: Wi-Fi connectivity, stylus touchscreen, and fast processing for web browsing. Further, this e-reader has the best PDF viewing technology available on e-reader devices.

Interface Analysis

Functionality

As an e-reader, the Neo's most basic affordances must be the following:
- Turning the device on and off.
- Viewing a list of ebooks currently available.
- Choosing a book for reading.
- Navigating forward and back while reading.

BeBook Neo provides a means to achieve this primarily using the circular controls that are front and centre on the device.

In addition, the Neo offers extra features for which extra controls have been added:
- Listening to music/audiobooks via a headphone jack.
- Connecting to Wifi. There is a wifi on/off switch on the side of the device.
- The stylus pen can be slid in and out of its housing on the top of the case.
- SD memory card slot for increasing the storage capacity.
- USB Interface for connecting to a computer.

The Stakeholders

This device appeals to a widely varied audience. Not only are environmentally concerned, avid book-readers likely to embrace such a device, but also the advanced PDF viewing functionality makes it appealing professionals and students. Therefore, its audience should not be presumed to possess above-average technical skills.

Functional Requirements

In a single "use-cycle" – the period from start up to shut down – the most important user interactions take place while the user is reading a book that they selected from the library. Therefore, the most important functional requirements are:

1. Easy and fast access to the next and previous page controls.
2. Easy and fast access to the font size increase/decrease controls.
3. Fast response time of the screen to page turns (within the constraints of the display technology used).
4. Easy and fast means of jumping to a particular page.
5. Easy and fast means of jumping to the table of contents.
6. Means of looking up a word in the dictionary
7. Means of adding annotations.

Other requirements that are not directly related to the primary purpose of reading are:

8. Neat and accessible display of all the books currently in the library.
9. Means to configure the wifi connection and launch the web browser.
10. Include stylus-specific applications such as note-taking and scribbling.

Problems with the Current Interface

Upon first use, a wide range of oversights on the user interface design become apparent. The three most important problems are:

1. The main controls: these consist of three concentric circular controls in the front of the device. The innermost is a button labeled "OK" that can be used
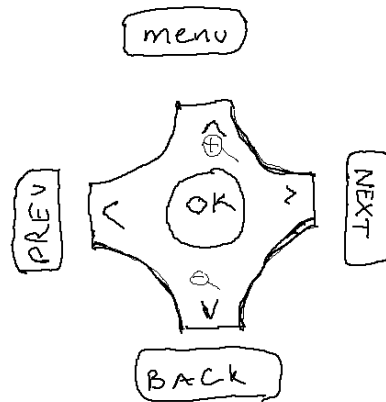
for selection. A silver ring surrounds this button. There is no indication to the user that they must interact with it. This ring is a four-directional navigator for selecting from a list of choices; when reading, it is used to adjust font size. The outer ring (white with labels) consists of 4 buttons: 2 for page turns, 1 for menu, and 1 for "back". Due to the lack of indicators, it is often difficult to understand when each ring should be used for navigation.

2. Aside from the main controls, most of the physical controls and interfaces of the device are on the bottom edge, including the on/off button. This is not very practical. It is reasonable to say that most users will hold the device either from the lower sides, or from the bottom, especially considering the inviting empty space that surrounds the front controls. Therefore, having controls such as volume adjustment and the on/off button at a location where they can easily be pressed accidentally is not wise.

3. Finally, in the library view, there is only one way for the user to see the list of books to choose from. This involves large icons, listed alphabetically by file name. For books with longer names (or file names that include the name of the author), often the names are truncated and it is difficult to tell which book is selected. There is apparently no setting to adjust the display mode. Also, this mode of navigation is impractical when the number of books is large, and the user has to keep flipping pages of listings to get to the one they want.

Design Solution

1. The main controls
   The Neo's current design is very beautiful, but not practical. Its white case and circular controls immediately reminds people of iPod, and their first instinct is to use one of the circular controls as a click wheel. However, for the purposes of this device, circular controls are unnecessary. The inner navigation ring is only used as a 4-way controller, so the circular shape does not help the user understand what they can do with it. Also, a click wheel would not help matters because the refresh rate of the screen could not keep up with the user input. More practical would be to separate these controllers from each other by having one 4-way controller in the centre, and split the

outer ring into 4 separate buttons. This way, every control can be clearly marked to indicate their functionality.

(Sketch made on BeBook Neo)

2. The bottom controls
   The placement choice for these controls is poor. For most such handheld devices, the external controls such as volume adjustment, headphone jack, and memory slot must be placed on upper sides. The power button is best suited on top of the device, where the user touches least, so that it can only be pressed through deliberate user actions.
3. The library view
   The library view can be fixed with a simple firmware fix. While the current configuration does not work too well, due to the limitations and nature of such a device, it is not useful to offer full configurability of the library view the way it is offered in, say, the Mac OS X's Finder. Instead, the software engineers can add a setting, where the user can choose between a few choices, such as icon view or list view, allowing a choice between larger icons vs. more area for the file name text.

Cost Estimate

For the changing the organization of the main controls, there will be minimal impact on the electronics because the controls are not being moved significantly. The cost for this fix comes from engineering a new case. This will take a few hours for a mechanical engineer, so the total cost estimate is approximately $35/hour * 5 hours = $175.

The software fix is even easier to implement. $35/hour * 4 hours = $140.

The bulk of the cost will come from moving the bottom controls to the top. This means that a new case must be built, and also that the internal electronics must be completely redesigned and tested from scratch.

$(\$35/\text{hour} * 7 \text{ hours})_{\text{Mechanical}} + (\$35/\text{hour}*20 \text{ hours})_{\text{Electrical Design}} + (\$25/\text{hour} * 20 \text{ hours})_{\text{Test and debug}} = \$1445.$

Total Estimated Cost: $1760